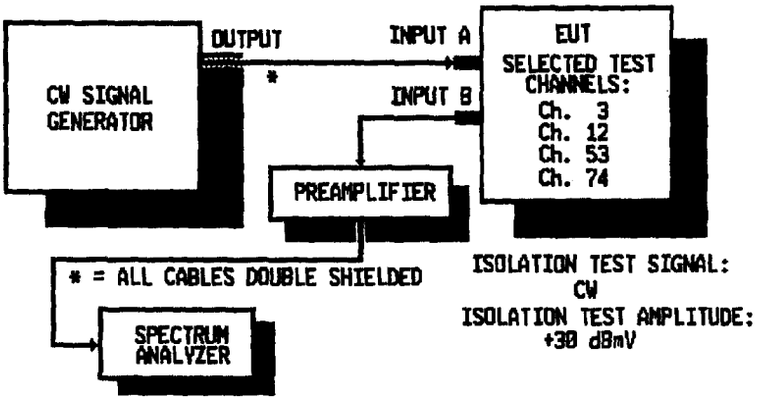

Figure 4.6 Non-selected to Selected Input Port A/B Switch Isolation Test Configuration

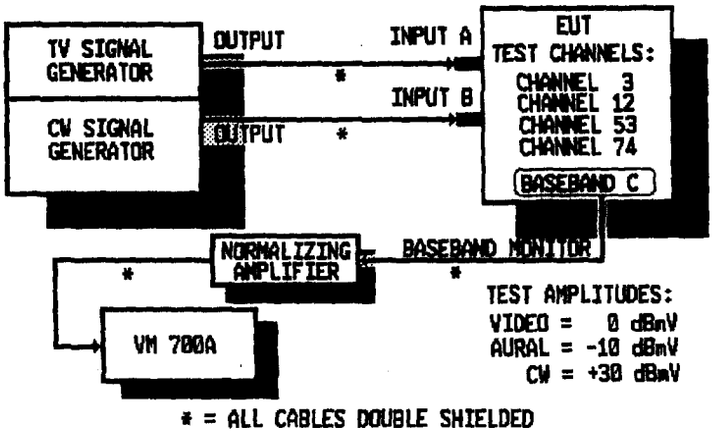

Figure 4.7 Non-selected Input to Output Port Switch Isolation Test Configuration

video baseband test point location. If the switch has less than 90 dB of isolation at the test frequency, the undesired signal will appear in the baseband display as a line spectrum at a frequency of 2.55 MHz.

After the level of the signal in the baseband display is recorded, the undesired signal is removed from the non-selected port and combined with the desired signal into the selected port (reduced by 60 dB). The new signal is the reference signal used in the signal substitution method. The reference signal is adjusted so that the resultant baseband signal level exactly equals the previously noted level when the signal was present at the non-selected port. The switch isolation is the ratio of the undesired signal level to the reference signal level. For example, if the final measured reference signal level is -52 dBmV, then the switch isolation (non-selected input port to output port) is 82 dB (30 dBmV - (-52 dBmV)). The test is repeated with port B selected on the EUT. Note: If the non-selected input port is not internally terminated, a 75 Ohm terminator is used at the input to this port.

4.3.3.3 VCR Input to Output Port Internal Switch Isolation

This test is designed to measure isolation between the input and output ports of a VCR internal switch when the VCR is operating in the "VCR Play" mode. In this mode, a cable television signal at the input port, on channel 3 or 4 (dependent on the selected VCR output channel), may interfere with the channel 3 or 4 VCR output to the television receiver due to inadequate internal switch isolation. Figure 4.8 shows the test configuration for this isolation measurement.

The VCR output channel is selected to channel 3, and a CW signal is input at the RF input connector at a frequency between the aural and visual carriers of channel 3 (approximately 2.55 MHz above the visual carrier). The CW signal is adjusted for an amplitude of +30 dBmV. A tape is inserted in the VCR containing a 0 IRE or 10 IRE flat field picture. The level of the CW signal is measured at the output of the VCR using a spectrum analyzer. The isolation of the VCR internal switch is the ratio of the input CW signal level to the measured output level (recorded in dB). Because the test frequency was chosen between the aural and visual carriers, at a frequency where video energy is minimal, dynamic range for this measurement should be 90 dB or better.

4.3.4 DPU Backfeed

Direct Pickup interference (DPU) is a form of co-channel interference which occurs as a result of the susceptibility of a receiver to ambient fields having in-band frequency components. The primary sources of DPU, in a receiver connected to a cable delivery system, are over-the-air television broadcast signals and signals

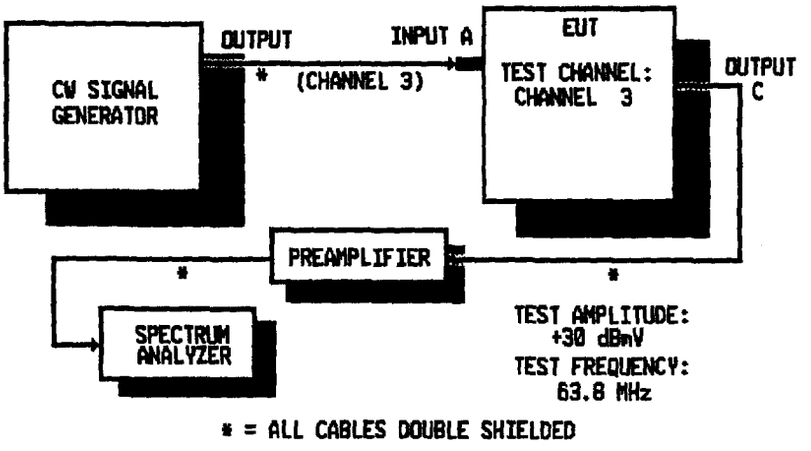

Figure 4.8 VCR Input to Output Port Internal Switch Isolation Test Configuration

from other fixed and mobile communications facilities operating in the same frequency spectrum as the cable delivery system. If a receiver connected to a cable delivery system is susceptible to DPU, the resultant interfering signal may be conducted back toward the cable delivery system and interfere with other subscribers' receivers connected to the system. This interference mechanism is similar to the local oscillator and backfeed mechanism discussed in Section 4.3.2.

For this test, the EUT is placed on a rotatable nonconducting table within a calibrated enclosure as shown in Figure 4.9. The enclosure is pre-calibrated for field uniformity over the volume of the EUT and for absolute field strength at each test channel. A full description of the requirements for a calibrated DPU test enclosure is contained in Section 3.3 of this report.

The DPU Backfeed test equipment configuration is shown in Figure 4.10. A desired television signal is input to the EUT via the TV signal generator (agile channel modulator and baseband generator). The desired video carrier is modulated with a 0 IRE or 10 IRE flat field modulation and set to a level of +15 dBmV at the input to the EUT. The aural carrier is unmodulated and adjusted to

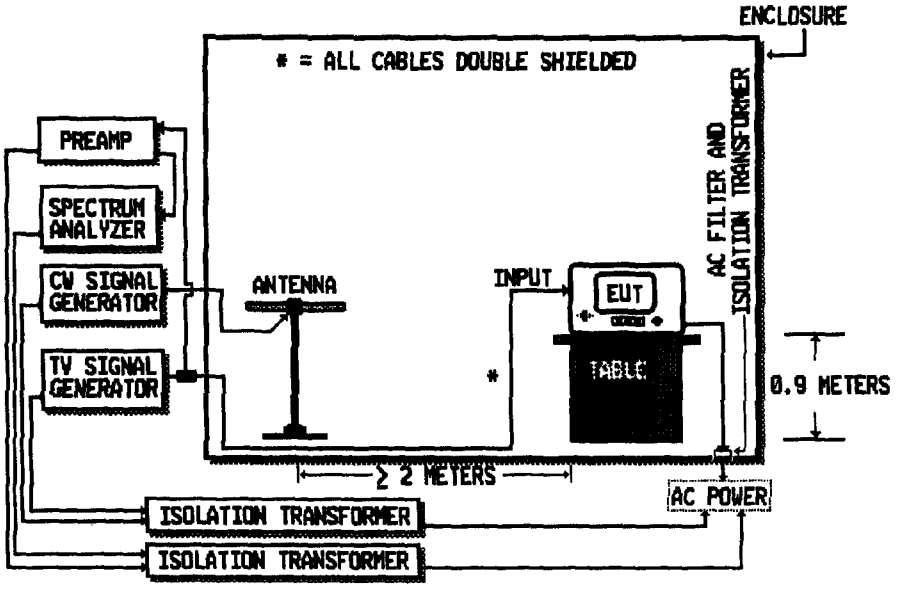

Figure 4.9 DPU Backfeed Test System Configuration

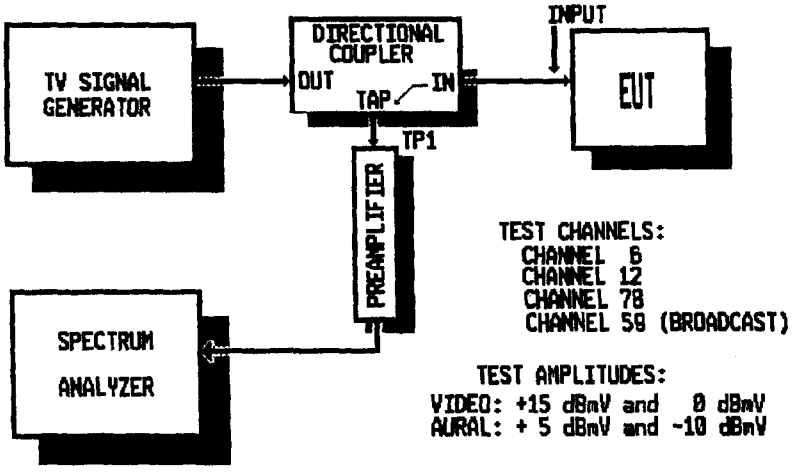

Figure 4.10 DPU Backfeed Test Equipment Configuration and Test Parameters

a level 10 dB below the video carrier level. The EUT is irradiated with a CW ambient field strength at a frequency 2.55 MHz above the desired video carrier frequency. The level of the ambient field strength is adjusted to 100 mV/m at the EUT. The EUT is rotated through an arc of 360° to maximize the DPU backfeed signal level. A directional coupler, preamplifier, and spectrum analyzer are used to measure the level of the DPU backfeed signal. The test is repeated for each of the four standard test channels and for a desired visual carrier level of 0 dBmV.

4.3.5 VCR Through-Loss

VCR through-loss is the ratio of the input RF signal level to the output RF signal level of a VCR when the VCR is operating in the through or TV mode (passing the RF signal to the next device in a cascade manner). The measurement is performed with a CW signal input to the VCR at a +10 dBmV level. The output is measured with a spectrum analyzer, and the ratio is the through-loss of the VCR recorded in dB. A block diagram of the VCR through-loss test equipment configuration is shown in Figure 4.11. The test is performed at four frequencies corresponding to the four standard test channels.

4.3.6 Adjacent Channel Rejection

Relatively high level adjacent channel signals are present at the input to a receiver which is connected to a cable delivery system. Inadequate adjacent channel rejection capability of the tuner can result in picture degradation due to adjacent channel interference. Those carriers which are closest in frequency to the desired channel present the greatest potential for interference. Because of this, adjacent channel rejection tests are performed for the following adjacent channel carriers: lower adjacent aural carrier, lower adjacent color subcarrier, and upper adjacent video carrier. In order to quantify the adjacent channel rejection for the three carriers listed above, objective tests are performed using the signal substitution method described in Section 4.2.4. A block diagram of the adjacent channel rejection test equipment configuration is shown in Figure 4.12.

The desired video carrier is modulated with a 0 IRE or 10 IRE flat field modulation. The visual carrier level is adjusted for +10 dBmV. The unmodulated aural carrier is set 10 dB below the visual carrier. A CW signal is combined with the desired channel at the input of the EUT to simulate the adjacent channel carrier under test. The CW signal is set for a level which represents the maximum allowable or, in the case of the lower adjacent channel color subcarrier, the maximum expected level. Since the FCC Rules allow a maximum 3 dB difference in amplitude between adjacent channels, the maximum upper adjacent video carrier level is +13 dBmV for this test. The lower adjacent aural carrier can

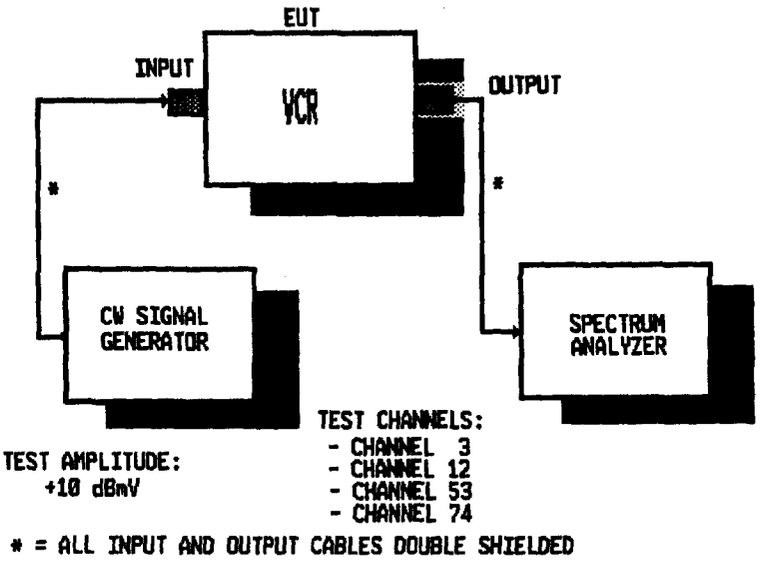

Figure 4.11 VCR Through-Loss Test Equipment Configuration and Test Parameters

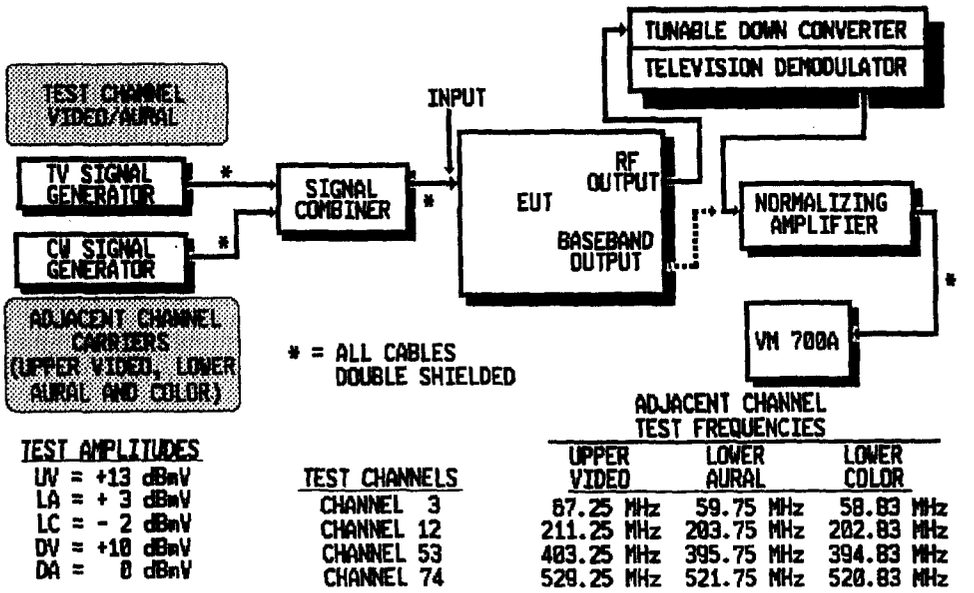

Figure 4.12 Adjacent Channel Rejection Test Equipment Configuration and Test Parameters

be within 10 dB of the lower adjacent video carrier, which can be 3 dB greater than the desired video carrier. The maximum lower adjacent aural carrier level is, therefore, +3 dBmV. The maximum expected lower adjacent color subcarrier is -2 dBmV.

Using a television measurement set having noise spectrum capability (or spectrum analyzer), the resultant in-band interfering signal is monitored at the video baseband measurement test point location. The resultant interfering signal will appear as a line spectrum in the baseband spectral display (averaging mode). The frequency of the baseband line spectrum is 1.5 MHz when a lower adjacent aural carrier is present, 2.41 MHz when the lower adjacent color subcarrier is present, and 3 MHz when the upper adjacent video carrier is present. If no signal is present, the resultant in-band interfering signal is below the noise floor of the EUT.

Using the signal substitution method, the adjacent channel carrier is removed and a reference signal input at the corresponding in-band RF frequency. The reference signal level is adjusted so that the resultant level of the line spectrum in the baseband spectral display is equal to the level observed when the adjacent channel carrier was present. The reference signal level is measured at the input of the EUT. The adjacent channel rejection is the ratio of the adjacent channel carrier level to the measured reference signal level.

For example, if the measured reference signal level for a lower adjacent aural carrier test is -58 dBmV, then the adjacent channel rejection is 61 dB (+3 dBmV - (-58 dBmV)). Further, the equivalent in-band desired to undesired signal ratio (carrier to interference ratio) is 68 dB (10 dBmV - (-58 dBmV)). The test is repeated for each of the three adjacent channel carriers and all four desired test channels.

4.3.7 Image Rejection

An image frequency is converted to an in-band IF signal at the output of the mixer, in a similar manner to the desired channel. For conventional single conversion tuners, the image video carrier falls 15 channels above the desired video carrier. Inadequate image filter rejection will result in picture degradation due to in-band image interference. A receiver connected to a cable delivery system will have an image carrier present for most channels. The level of the image carrier can be significantly higher than the desired video carrier. The FCC requires that visual carriers at the receiver input vary no more than 10 dB, plus 1 dB for each 100 MHz of bandwidth above 300 MHz. In a 550 MHz cable delivery system, the variation between carriers can be as much as 13 dB.

In order to quantify the image rejection characteristics of the receiver under test, an objective test is performed using the signal substitution method. The test procedure parallels the adjacent channel test procedure described in the previous Section.

A block diagram of the image rejection test equipment configuration is shown in Figure 4.13. The desired signal consists of a video carrier modulated with the standard 0 IRE or 10 IRE flat field modulation. For this test, the desired video carrier level is set to 0 dBmV. The desired aural carrier is unmodulated and input at a level 10 dB below the video carrier (-10 dBmV). A CW signal is used to simulate the image video carrier. The frequency of the image carrier is 90 MHz above the desired video carrier frequency. The image carrier level is adjusted to a level 13 dB above the desired video carrier level (+13 dBmV), representing the maximum allowable variation for a 550 MHz cable delivery system.

A television measurement set having noise spectrum capability is used to monitor the baseband spectrum. The resultant in-band image interfering signal will appear in the baseband spectral display as a line spectrum at a frequency of 1.5 MHz. Using the signal substitution method, image rejection is measured in the identical manner to adjacent channel rejection described in the preceding Section and in the example of Section 4.2.4. This procedure yields the image rejection (recorded in dB) and the equivalent in-band D/U signal ratio for the worst case amplitude variation between the desired and image video carriers. The image rejection test is performed on all four standard test channels.

4.3.8 Tuner Overload

A continuous spectrum of high level signals is present at the input to the consumer receiving device when the device is connected to a cable delivery system. The number and level of video carriers present at the input of the receiver, combined with the nonlinear characteristics of the receiver's RF amplifier(s), may result in an unacceptable level of distortion in the video picture (tuner overload). The most pronounced of the distortion products are referred to as Composite Triple Beat (CTB) and Composite Second Order (CSO). The CTB products fall on the video carrier of the desired channel. The CSO products fall displaced in frequency from the desired video carrier by ±.75 MHz or ±1.25 MHz for a Standard or IRC channelization plan and on the video carrier for an HRC channelization plan (the CSO products cannot be distinguished from the CTB products in an HRC system). Other distortion products, such as intermodulation and cross modulation, may also be created within the tuner; however, it is anticipated that the level of these products will be less than the levels of CTB and CSO for systems having a large number of channels.

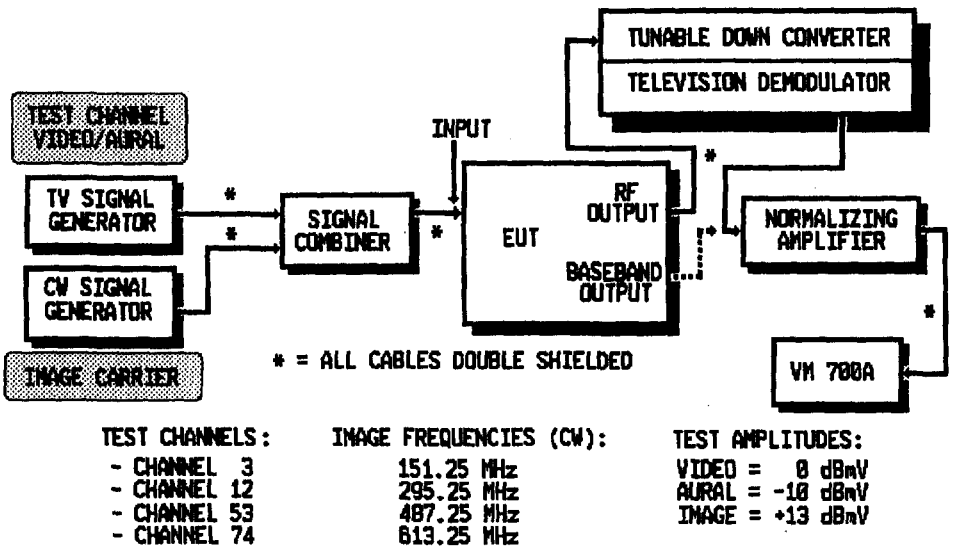

Figure 4.13 Image Rejection Test Equipment Configuration and Test Parameters

In order to quantify tuner overload performance, an objective test is performed which relies on the signal substitution method described previously. The test procedure requires the use of a special multi-channel generator (Matrix generator) to simulate the signals which are delivered by the cable system.

A block diagram of the tuner overload test equipment configuration is shown in Figure 4.14. A desired signal is input through a combiner to the EUT. The desired channel video carrier is modulated with a 0 IRE or 10 IRE flat field modulation and adjusted to a level of +15 dBmV. The desired aural carrier is unmodulated and set to a level 10 dB below the desired video carrier level (+5 dBmV).

Because the CTB products fall on the desired carrier frequency, and the desired channel must be active in order to achieve normal operation of the tuner, it is necessary to frequency offset the desired channel in order to resolve the CTB products. For small offsets, the tuner AFC will easily "pull" to the offset frequency. It is recommended that the tuner overload tests be performed with the desired channel offset downward by at least 80 kHz.

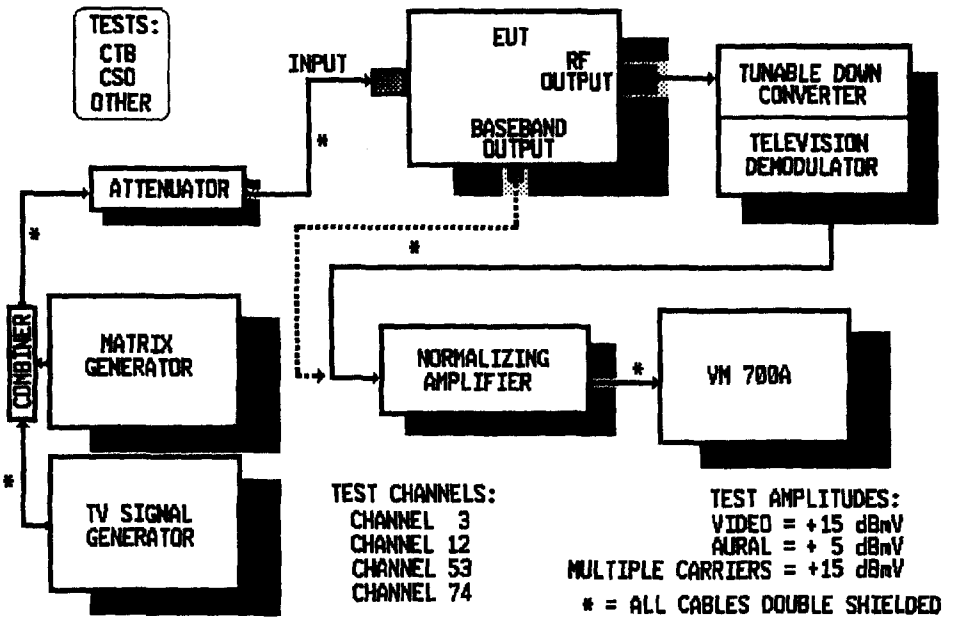

Figure 4.14 Tuner Overload Test Equipment Configuration and Test Parameters

Multiple CW signals are combined with the desired video and aural carriers and input to the EUT through a combiner. The CW signals represent the other video carriers delivered by the cable system between 54 MHz and 550 MHz. The desired video carrier and the image frequency video carrier (15 channels above the desired video carrier) are deactivated on the Matrix generator. The levels of all remaining CW carriers are set to +15 dBmV at the input to the EUT.

A television measurement set having noise spectrum capability is connected to the baseband video test point location through a normalizing amplifier. The resultant distortion products will appear as spectral lines in the display of the baseband spectrum (averaging mode). The level and frequency of each spectral line is recorded, and the Matrix generator is then turned off. Using the signal substitution method, an in-band reference signal is sequentially input to the EUT at the RF frequencies which correspond to the observed baseband spectral lines. The reference signal RF frequency is equal to the offset video carrier frequency plus the frequency of the baseband distortion product. At each frequency, the reference signal level is adjusted until the substitute signal, as observed in the baseband display, is equal to the level which was present when the Matrix

generator was active. The process is repeated for each of the distortion products observed. This measurement process results in an equivalent in-band D/U signal ratio (recorded in dB) for each distortion product.

4.4 Detailed Test Procedures

This section provides detailed test procedures for the eight tuner performance categories.

4.4.1 General Test Conditions

For each of the tuner performance tests described below, the EUT and test equipment are properly impedance matched. All cable losses, attenuator losses, amplifier gains, combiner losses, and directional coupler losses (through-loss and tap outputs) are measured and recorded for each test frequency. When required, additional amplification and filtering may be used. All calibrated signal inputs to the EUT are referenced to generator settings or generator output attenuator settings. All measurement receivers and signal generators are verified for accuracy using a NIST traceable calibrated power meter.

The measurement of the level of the desired modulated video carrier will be performed with a spectrum analyzer processing bandwidth of 300 kHz or greater and no video filtering. Narrower processing bandwidths and video filtering or averaging may be used when measuring unmodulated (CW) carriers and/or resultant unmodulated baseband interfering signals.

4.4.2 Re-Radiation of Cable Signals

4.4.2.1 Test Conditions

Test Channels: 15, 25, 37, and 53
Desired Video Carrier Level: +15 dBmV
Desired Aural Carrier Level: +5 dBmV
Video Modulation: 0 IRE or 10 IRE Flat Field
Test Range: FCC Approved, Three-Meter, Open-Field Range

4.4.2.2 Measurement Procedures

STEP #1 Place the EUT on a non-conductive, rotatable turntable elevated 0.9 meters above the ground plane. See Figures 4.1 and 4.2.

STEP #2 Position the test generator off of the three-meter, open-field test range.

Note: Radiated emissions measurements must be made on the test generator and terminated coaxial input cable (no EUT present) to verify that emissions emanating from the generator and input cable are well below the strictest leakage requirement of 26 dBuV/m at 3 meters.

STEP #3 Connect the test generator output to the input of the EUT via a double shielded, 75Ω coaxial cable and adjust for the required level at the input to the EUT.

STEP #4 Apply power to the EUT and tune to the desired test channel. Center the spectrum analyzer display for the desired video carrier frequency. Adjust the horizontally polarized receive dipole to the appropriate length for the desired video carrier frequency.

STEP #5 While viewing the spectrum analyzer display, maximize the measured emission by rotating the EUT over a 360° arc and by raising and lowering the receive antenna between one and four meters above the ground plane. Record the maximum emission amplitude.

STEP #6 Repeat STEP #5 with the EUT turned off.

STEP #7 If the EUT contains an A/B switch, select the opposite (open) input port on the EUT and repeat STEPS 4 and 5.

STEP #8 Repeat STEPS 3 through 7 for each of the remaining three test channels.

4.4.3 Local Oscillator Leakage and Backfeed

4.4.3.1 Test Conditions

Test Channels: 3, 12, 53, and 74
Desired Video Carrier Level: 0 dBmV and +15 dBmV
Desired Aural Carrier Level: -10 dBmV and +5 dBmV
Video Carrier Modulation: 0 IRE or 10 IRE Flat Field
Aural Carrier Modulation: Unmodulated

4.4.3.2 Measurement Procedures

STEP #1 Configure the EUT and test equipment as shown in Figure 4.3, and adjust the desired video carrier level to +15 dBmV at the input to the EUT. Adjust the desired aural carrier level to +5 dBmV.

STEP #2 Apply power to the EUT and tune to the desired test channel. Center the spectrum analyzer display on the local oscillator frequency (see table below).

Test Channel	Local Oscillator Frequency
3	107 MHz
12	251 MHz
53	443 MHz
74	569 MHz

STEP #3 Measure the local oscillator signal level on the spectrum analyzer and record on the data sheet.

STEP #4 Repeat STEPS 2 and 3 for a video carrier input level of 0 dBmV and an aural carrier level of -10 dBmV.

STEP #5 The frequency band from 5 MHz to 600 MHz will be investigated for other spurious emissions by scanning the spectrum on the spectrum analyzer in 100 MHz segments and recording spurious conducted emissions exceeding -35 dBmV.

STEP #6 Repeat STEPS 2 through 5 for each test channel.

4.4.4 A/B Switch Isolation

Three separate switch isolation tests are performed in this category. For devices having two selectable input ports, isolation is measured between the selected and non-selected input ports and between the non-selected input port and the output port. The third switch isolation test will be performed on VCR's only. This test measures the isolation between the input and output port when the VCR is operating in the "VCR Play" mode (channel 3 only).

4.4.4.1 Non-Selected to Selected Input Port Isolation

Each EUT containing two selectable input ports will be tested for isolation between the non-selected and selected input ports (A to B and B to A). See Figure 4.4 and Figure 4.6.

4.4.4.1.1 Test Conditions

Test Channels: 3, 12, 53, and 74.
Test Signal Level: +30 dBmV
Test Signal Modulation: Unmodulated (CW)

Note: The input impedance of each EUT must be measured to determine if its non-selected input port is internally terminated. If the non-selected port is not internally terminated, install a 75 Ohm termination for this test.

4.4.4.1.2 Measurement Procedures

STEP #1 Configure the EUT and test equipment as shown in Figure 4.6.

STEP #2 Apply power to the EUT and select the desired test channel. Select the B input port on the EUT.

STEP #3 Set the CW generator to the video carrier frequency of the first test channel and adjust the level for +30 dBmV at the A input port (non-selected input port) of the EUT.

STEP #4 Center the spectrum analyzer display on the desired video carrier frequency and measure the level of the test signal at input port B. The measurement system (preamplifier and spectrum analyzer) must be capable of resolving a signal of -60 dBmV (75 Ohms).

STEP #5 Calculate the isolation by subtracting the measured value of the test signal at port B (in units of dBmV) from the +30 dBmV input level at port A.

STEP #6 Repeat STEP #2 through STEP #5 with the A input port selected on the EUT and the test signal generator connected to the B input port.

STEP #7 Repeat STEP #2 through STEP #6 for the remaining three test channels.

STEP #8 Repeat STEP #2 through STEP #7 with power to the EUT turned off.

4.4.4.2 Non-Selected Input Port to Output Port Isolation

Each EUT containing two selectable input ports will be tested for isolation between the non-selected input port and the output port (A to C and B to C). See Figure 4.4 and Figure 4.7. Note: If the non-selected input port is not internally terminated, install a 75 Ohm termination at the input port for this test.

4.4.4.2.1 Test Conditions

Desired Test Channels: 3, 12, 53, and 74
Test Signal Amplitudes (at the EUT RF input port):
- Desired Video Carrier: 0 dBmV
- Desired Aural Carrier: -10 dBmV
- Undesired CW Carrier: +30 dBmV

Modulation:
- Desired Video Carrier: 0 IRE or 10 IRE Flat Field
- Desired Aural Carrier: Unmodulated
- Undesired CW Carrier: Unmodulated

Undesired CW Carrier Frequencies:

Test Channel	Undesired Carrier Frequency
Channel 3	63.80 MHz
Channel 12	207.80 MHz
Channel 53	399.80 MHz
Channel 74	525.80 MHz

4.4.4.2.2 Initial Calibration

STEP #1 Configure the test system as shown in Figure 4.7.

STEP #2 Adjust the TV signal generator (desired channel) for the desired video and aural carrier levels and modulation as measured at input port A of the EUT. Record generator/attenuator settings for each test channel.

STEP #3 For each undesired test frequency, adjust the CW signal generator (undesired signal generator) to obtain a signal level of +30 dBmV at input port B. Record the generator output level for each of the four undesired test frequencies.

4.4.4.2.3 Measurement Procedures

STEP #1 Apply power to the EUT and select the first test channel. Select input port A on the EUT (A to C active).

STEP #2 Adjust the TV signal generator (desired channel) to the settings obtained in STEP #2 of the calibration procedure for the first test channel.

STEP #3 Adjust the CW signal generator for the undesired test frequency for the first test channel and the output setting obtained in STEP #3 of the calibration procedure.

STEP #4 Set up the VM 700A television measurement set to display the noise spectrum of Field 1, Line 16 (0 IRE flat field). [Note: Verify that the EUT baseband signal is normalized to 1 Volt (Peak).] Scan the noise spectral display of the VM 700A (averaging mode) for an in-band interfering signal at approximately 2.55 MHz in the baseband display. Record the magnitude of the interfering signal.

Note: If no interfering signal is present, the isolation of the switch is sufficient to attenuate the undesired signal below the noise floor of the EUT. In this circumstance, record the noise floor level and proceed to the next test channel (STEP #8).

STEP #5 Remove the undesired CW signal from the B input port and combine the signal with the desired signal at the A input port (reduce the undesired signal generator output level by 60 dB). This new input is the signal substitute reference signal. The reference signal produces a similar interfering signal in the baseband spectral display to that produced when the undesired signal was present at the B input port.

STEP #6 Adjust the reference signal generator output until the interfering baseband signal magnitude is equal to the magnitude recorded in STEP #4. Record the reference generator output level.

STEP #7 Calculate the isolation by subtracting the reference generator output level recorded in STEP #6 from the undesired signal generator output level recorded in STEP #3 of the Initial Calibration Procedure.

STEP #8 Repeat STEP #1 through STEP #7 for the three remaining test channels.

STEP #9 Repeat STEP #1 through STEP #8 with input port B selected (desired signal input at port B and the undesired signal input at port A).

4.4.4.3 VCR Input to Output Port Internal Switch Isolation

Each VCR is tested for isolation between the RF input port and the RF output port when the VCR is operating in the "VCR Play" mode. See Figure 4.5 and Figure 4.8.

4.4.4.3.1 Test Conditions

Desired Test Channel: 3
Undesired CW Carrier Amplitude: +30 dBmV
Undesired CW Carrier Frequency: 63.80 MHz
Undesired CW Carrier Modulation: Unmodulated
VCR Output Channel: 3
VCR Operating Mode: "VCR Play" Mode
Test Tape Video Modulation: 0 or 10 IRE Flat Field

4.4.4.3.2 Measurement Procedures

STEP #1 Configure the test system and EUT as shown in Figure 4.8. Select channel 3 as the output channel on the VCR.

STEP #2 Adjust the CW signal generator (undesired signal generator) for a level of +30 dBmV at the input to the VCR.

STEP #3 Insert the test tape in the VCR and activate the "VCR Play" mode. Check to insure that the EUT is in the VCR operating mode.

STEP #4 Center the spectrum analyzer display on the undesired CW carrier frequency (63.80 MHz). Measure the level of the CW signal. Note: If no interfering signal is present, the isolation of the internal switch is sufficient to attenuate the undesired signal below the noise floor of the VCR.

STEP #5 Calculate the internal switch isolation by subtracting the level measured in STEP #4 (in dBmV) from +30 dBmV.

4.4.5 DPU Backfeed

Performance of the DPU Backfeed test requires a calibrated DPU test enclosure. The test enclosure must have a field uniformity of ±4 dB over the volume of the EUT at each of the test frequencies and be calibrated for absolute field strength.

4.4.5.1 Test Conditions

Test Channels: 6, 12, 78, and 59 (broadcast)
Desired Video Carrier Level: 0 dBmV and +15 dBmV
Desired Aural Carrier Level: -10 dBmV and +5 dBmV
Undesired Ambient Field Level: 100 mV/m
Video Carrier Modulation: 0 IRE or 10 IRE Flat Field
Aural Carrier Modulation: Unmodulated
Undesired Signal Modulation: Unmodulated
Undesired Signal Frequencies:

Test Channel	Undesired Signal Frequency
6	85.80 MHz
12	207.80 MHz
78	549.80 MHz
59 (Broadcast)	743.80 MHz

4.4.5.2 Measurement Procedures

STEP #1 Configure the EUT and test equipment as shown in Figures 4.9 and 4.10. Apply power to the EUT and tune to the first test channel.

STEP #2 Set the TV signal generator to the first test channel and adjust the output level of the generator to produce a desired video carrier level to +15 dBmV at the input to the EUT. Adjust the desired aural carrier level to +5 dBmV.

STEP #3 Adjust the CW signal generator to produce an ambient field strength of 100 mV/m at the undesired signal frequency for the first test channel. Note: The DPU enclosure should be pre-calibrated so that the output level of the CW signal generator can be directly related to field strength at the EUT for each test channel.

STEP #4 Center the spectrum analyzer display on the undesired signal frequency.

STEP #5 Measure the DPU backfeed signal level on the spectrum analyzer and record on the data sheet.

STEP #6 Repeat STEPS 2 through 5 for a video carrier input level of 0 dBmV and an aural carrier level of -10 dBmV.

STEP #7 Repeat STEPS 1 through 6 for each of the three remaining test channels.

4.4.6 VCR Through-Loss

4.4.6.1 Test Conditions

Test Channels: 3, 12, 53, and 74.
Video Carrier level: +10 dBmV
Modulation: Unmodulated (CW)
EUT Operating Mode: RF Through Mode Selected (TV mode).

4.4.6.2 Measurement Procedures

STEP #1 Configure the EUT and test equipment as shown in Figure 4.11. Apply power to the EUT and select the RF through mode (TV mode) of operation.

STEP #2 Adjust the CW signal generator to the video carrier frequency of the desired test channel and adjust the level of the unmodulated carrier to +10 dBmV at the input to the EUT.

STEP #3 Center the spectrum analyzer display on the frequency of the input signal and measure and record the signal level at the RF output port of the EUT.

STEP #4 Calculate the EUT through-loss by subtracting the output level measured in STEP #3 (dBmV) from the input level of +10 dBmV.

STEP #5 Repeat STEPS 2 through 4 for each of the remaining three test channels.

4.4.7 Adjacent Channel Rejection

Adjacent Channel rejection measurements are performed for the lower adjacent channel color subcarrier, the lower adjacent channel aural carrier, and the upper adjacent channel video carrier. These tests are performed in a sequential manner starting with the lower adjacent channel color subcarrier. A two-step testing process is used, an initial calibration measurement, followed by the adjacent channel rejection measurement.

4.4.7.1 Test Conditions

Test Channels: 3, 12, 53, and 74
Adjacent Channel Carrier Frequencies:

Channel	Lower Color	Lower Aural	Upper Video
Channel 3	58.83 MHz	59.75 MHz	67.25 MHz
Channel 12	202.83 MHz	203.75 MHz	211.25 MHz
Channel 53	394.83 MHz	395.75 MHz	403.25 MHz
Channel 74	520.83 MHz	521.75 MHz	529.25 MHz

Test Signal Amplitudes (at the EUT RF input port):

- Desired Video Carrier: +10 dBmV
- Desired Aural Carrier: 0 dBmV
- Lower Adjacent Channel Color Carrier: - 2 dBmV
- Lower Adjacent Channel Aural Carrier: + 3 dBmV
- Upper Adjacent Channel Video Carrier: +13 dBmV

Modulation:

- Desired Video Carrier: 0 IRE or 10 IRE Flat Field
- Desired Aural Carrier: Unmodulated
- Lower Adjacent Channel Color Carrier: Unmodulated
- Lower Adjacent Channel Aural Carrier: Unmodulated
- Upper Adjacent Channel Video Carrier: Unmodulated

4.4.7.2 Initial Calibration

STEP #1 Configure the test system and EUT as shown in Figure 4.12.

STEP #2 Adjust the test signal generator (desired channel) for the desired video and aural carrier levels and modulation as measured at the input to the EUT. Record generator/attenuator settings for each test channel.

STEP #3 For each test channel, adjust the CW signal generator (interfering signal generator) to obtain the required adjacent channel carrier level for each of the three adjacent channel signals as measured at the EUT's RF input port. Record generator output level for each adjacent channel frequency at each of the four test channels.

Note: When testing a cable converter, install the demodulator at the RF output of the cable converter to provide the baseband video signal.

4.4.7.3 Measurement Procedures

STEP #1 Adjust the test signal generator (desired channel) to the settings obtained in STEP #2 of the calibration procedure for the first test channel.

STEP #2 Adjust the CW signal generator for the lower adjacent color subcarrier frequency and output setting obtained in STEP #3 of the calibration procedure.

STEP #3 Set up the VM 700A television measurement set to display the noise spectrum of Field 1, Line 16 (0 IRE flat field). [Note: Verify that the EUT baseband signal is normalized to 1 Volt (Peak).] Scan the noise spectral display of the VM 700A (averaging mode) for an in-band interfering signal at approximately 2.42 MHz. Record the magnitude of the interfering signal.

Note: If no interfering signal is present, the level of the resultant interfering signal is below the noise floor of the EUT. In this circumstance, record the noise floor level and proceed to the next adjacent channel signal (STEP #6).

STEP #4 Change the frequency of the CW signal generator to the frequency of an equivalent in-band interfering signal (signal substitute reference signal). The frequency of the lower color subcarrier reference signal will be approximately equal to the desired video carrier frequency plus 2.42 MHz (for test channel

3, the reference signal, for the lower color subcarrier, will be approximately 63.67 MHz). Note that the reference signal produces a similar spectral line in the baseband spectral display as that produced by the lower adjacent color subcarrier.

STEP #5 Adjust the CW generator output level until the level of the reference interfering signal, as viewed in the baseband spectral display, is equal to the level recorded in STEP #3. Record the CW generator setting. The difference (dB) of the generator setting required to produce the lower adjacent channel color subcarrier (recorded in STEP #3 of the calibration procedure) and the final generator setting of the signal substitute reference signal is the adjacent channel rejection for the lower adjacent channel color subcarrier.

STEP #6 Repeat STEP #2 through STEP #5 for the lower adjacent channel aural carrier and the upper adjacent channel video carrier. The baseband interfering frequencies and reference signal frequencies are provided below for each of the adjacent channel signals and each of the four test channels.

STEP #7 Repeat STEP #1 through STEP #6 for each of the remaining test channels.

Approximate Frequency of Baseband Interfering Signal:

- Lower Adjacent Color Subcarrier: 2.42 MHz
- Lower Adjacent Aural Carrier: 1.50 MHz
- Upper Adjacent Video Carrier: 3.00 MHz

Approximate Reference Frequency for Lower Adjacent Color:

- Channel 3: 63.67 MHz
- Channel 12: 207.67 MHz
- Channel 53: 399.67 MHz
- Channel 73: 525.67 MHz

Approximate Reference Frequency for Lower Adjacent Aural:

- Channel 3: 62.75 MHz
- Channel 12: 206.75 MHz
- Channel 53: 398.75 MHz
- Channel 74: 524.75 MHz

Approximate Reference Frequency for Upper Adjacent Video:

- Channel 3: 64.25 MHz
- Channel 12: 208.25 MHz
- Channel 53: 400.25 MHz
- Channel 74: 526.25 MHz

4.4.8 Image Rejection

The Image Rejection test procedure is similar to the Adjacent Channel Rejection test procedure described in the preceding section. The procedure consists of an initial calibration in which the levels of the desired and undesired carriers are established at the input to the EUT, followed by the actual measurement procedure, in which signal substitution is employed. This test does not apply to cable converters employing double frequency conversion.

4.4.8.1 Test Conditions

Desired Test Channels: 3, 12, 53, and 74
Image Channel Carrier Frequencies:

Test Channel	Image Frequency
Channel 3	151.25 MHz
Channel 12	295.25 MHz
Channel 53	487.25 MHz
Channel 74	613.25 MHz

Test Signal Amplitudes (at the EUT RF input port):
- Desired Video Carrier: 0 dBmV
- Desired Aural Carrier: -10 dBmV
- Image Channel Video Carrier: +13 dBmV

Modulation:
- Desired Video Carrier: 0 IRE or 10 IRE Flat Field
- Desired Aural Carrier: Unmodulated
- Image Video Carrier: Unmodulated

4.4.8.2 Initial Calibration

STEP #1 Configure the test system and EUT as shown in Figure 4.13.

STEP #2 Adjust the TV signal generator (desired channel) for the desired video and aural carrier levels and modulation as measured at the input to the EUT. Record generator/attenuator settings for each test channel.

STEP #3 For each test channel, adjust the CW signal generator (image signal generator) to obtain the required image channel carrier level at the EUT's RF input port. Record the generator output level for each of the four test channels.

Note: When testing a cable converter, install the demodulator at the RF output of the cable converter to provide the baseband video signal.

4.4.8.3 Measurement Procedures

STEP #1 Adjust the TV signal generator (desired channel) to the settings obtained in STEP #2 of the calibration procedure for the first test channel.

STEP #2 Adjust the CW generator for the image carrier frequency and output setting obtained in STEP #3 of the calibration procedure for the first test channel.

STEP #3 Set up the VM 700A television measurement set to display the noise spectrum of Field 1, Line 16 (0 IRE flat field). [Note: Verify that the EUT baseband signal is normalized to 1 Volt (Peak).] Scan the noise spectral display of the VM 700A (averaging mode) for an in-band interfering signal at approximately 1.5 MHz in the baseband display. Record the magnitude of the interfering signal.

Note: If no interfering signal is present, the level of the resultant interfering signal is below the noise floor of the EUT. In this circumstance, record the noise floor level and proceed to the next test channel (STEP #6).